Overview

The purpose of this final project is to demonstrate the skills you have learned in the second half of this course. To do so, you will find a data set to explore and analyze that is of interest to you in teams of two. You will then present (7-10 minutes) your findings during the final exam period.

Quadratic Approximation

Begin by creating 3 DAG models. Your X variables can be either discrete or continuous, however one of your X variables must be continuous. Your Y variable must also be continuous.

1. A model for Y with X_1.

2. A model for Y with X_2.

3. A model for Y with X_1 and X_2.

Next, create three quadratic models using `quap` using priors that have some scientific backing or you have prior information about. For example, if I am trying to predict mammal sleep patters, I would use a prior of 7 hours since that is the average amount of sleep I get. Explain why you used the priors you used and cite any sources you use. Simulate the priors to ensure they will work, discuss any changes you ended up making and why.

Finally, create a plot comparison plot and counterfactual plots. Show the results of `precis` and explain what they mean. Explain any other findings of interest.

MCMC

Rerun the models using MCMC techniques. Check the chains and ensure the models work correctly. Discuss any differences. Compare the models using WAIC or an alternative comparison technique. Which model is best?

Submission

You will submit a Quarto Document for this Project with your code, and slides if you choose to use them. Also submit your data. There should not be two code chunks that do not have text separating them, explain what you are going to do and then your findings from the code.